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The Curator for the cryptogamic section of the Herbarium Boissier at Chambésy, near Geneva, Switzerland, desires to exchange mosses and hepatics with American and Canadian Bryologists. The Herbarium Boissier has a large collection of duplicates, mostly European with some exotics. For further particulars address Monsieur G. Colomb-Duplan, Les Tordils, Ouchy-Lausanne, Switzerland.

RAMALINA RIGIDA IN MASSACHUSETTS.

Since I published my note on this species (Bryologist, Vol. IX., No. 2, Mar. 1906, p. 32.) I have had some ample and more typical specimens sent me from the Island of Martha's Vineyard where it grows with *Usnea b. ceratina* on *Juniperus*. In Decades of North American Lichens, Cummings, Williams and Seymour, No. 199, I find specimens from Brewster, Massachusetts, collected on November 10, 1904, by L. A. Crocker. *Ramalina rigida* Pers. seems to have a New England range almost identical with the Seaside Sparrow (*Ammodramus maritimus*), an Upper Austral species, and the plant may evidently be looked for over the entire Cape and south shore region of Massachusetts, as well as along the coasts of Rhode Island and Connecticut.

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NOTES ON THE LIFE HISTORY OF THE MNIMUMS.

PHEBE M. TOWLE.

The study of the life history of some of the mosses which was begun in the spring of 1905, has been continued during the past year. The observations for 1903 upon the Hair-caps gave for *Polytrichum commune* and *P. juniperinum* the time of maturing of antheridia and archegonia and their contents in April, and the time of the maturing of the sporophytes in August of the following year, a period of about sixteen months. The observations of 1904 upon *Catherinea undulata* gave the time of maturity of the antheridia and archegonia and their contents in May, and the time of the maturity of the sporophytes in the following March and April, a period of about eleven months.

The observations for 1905 have been chiefly upon the Mniiums and upon these we have made only a good beginning. There are only three Mniiums on this list and the work on one of these is unsatisfactory. It is hoped that careful observation in 1906 may make this clear and complete the list.

Mnium sylvaticum grows in shady places, in the woods near the brooks, and in damp, rocky places. It is a beautiful bright green moss in early spring. On April 13th, the sporophytes were shedding their spores. On June 20th, *M. sylvaticum* heads which are bisexual were examined. Neither antheridia nor archegonia when undisturbed were open, but disturbed antheridia discharged sperm mother cells. About three weeks later, July 14th, in one head, two archegonia had grown to twice the height of the others.

A second head had one archegonia twice the height of the others. The bases of these taller ones were light green, evidently owing to the development of the new sporophyte within. On August 9th, the sporophytes showed with a hand-lens, and on Sept. 22d they could be plainly seen with the unaided eye, being about $\frac{1}{4}$ inch high. On Nov. 5th, the sporophytes were a little taller, averaging about $\frac{3}{8}$ inches high. The stems were reddish brown. The calyptra came off easily and the part underneath the calyptra was bright green. By Nov. 28th, they had grown to $\frac{1}{2}$ inches high, but had not otherwise changed in appearance.

While the observations for the season were not sufficiently full to justify final conclusions on all points, it was found that the maturing of the sperm and egg cells is between June 20th and July 14th or better, during the latter part of June, for the sporophytes had begun to grow by July 14th, and that the sporophytes were discharging spores during the latter half of April. So we may conclude that in *Mnium sylvaticum* the time from the maturity of the antheridia and archegonia and their contents to the maturity of the sporophytes is about ten months.

Mnium affine ciliare grows in nearly the same places as *M. sylvaticum*. The shedding of the spores from the sporophytes of *Mnium affine ciliare* was recorded for May 16th. On May 23d antheridia were open and discharging sperm mother cells. The motile sperm cells were very active. This is a dioicous moss. On June 5th, four archegonia of one tuft were open, and on June 20th in one archegonial head eight archegonia were dark, dead, five were open and two were not open but bright. On July 14th, in one archegonial head all but two were dark. In another all but one were dark. These living ones were about three times as tall as the dead ones. They were bright green nearly to the tip. These were the new sporophyte plants. On September 22d the new sporophytes could be plainly seen. Nov. 5th they were $\frac{5}{8}$ inches high. The stems were reddish brown to the calyptra underneath which they were bright green. During November the moss plants put forth a vigorous growth of stem and leaf.

From the season's observations *Mnium affine ciliare* appears to begin to mature its sperm and egg cells in the latter part of May, continuing the work through most of June, and the sporophyte maturity comes during the following May. So for *M. affine ciliare* the time from the maturity of the antheridia and archegonia and their contents to the maturity of the sporophytes is about eleven months.

Mnium Drummondii.—Closely associated with *M. affine* in locality, and closely resembling it in appearance was a bisexual moss which I took to be *M. Drummondii*. This moss was shedding spores on May 16th, as was *M. affine*. On May 30th in one head, showing both archegonia and antheridia two archegonia were open. No antheridia were open. On June 1st, another head was examined, a few archegonia were open but more were closed. All the antheridia were closed. On August 9th, four little sporophytes were seen with the aid of a hand-lens in one head of *M. Drummondii*.

I have no later observations on this moss. But these observations indi-

cate the fruiting seasons to be the same as in *M. affine ciliare*, with a period of eleven months from the maturity of the antheridia and archegonia and their contents in June, to the maturity of the sporophytes in the following May. This similarity of location, appearance and fruiting time between *M. affine ciliare* and *M. Drummondii* suggest the question of relationship between them, and if there is a relationship how close is it?

The question will lend an added interest to the observations of the coming season.

Burlington, Vermont, Feb. 28, 1906.